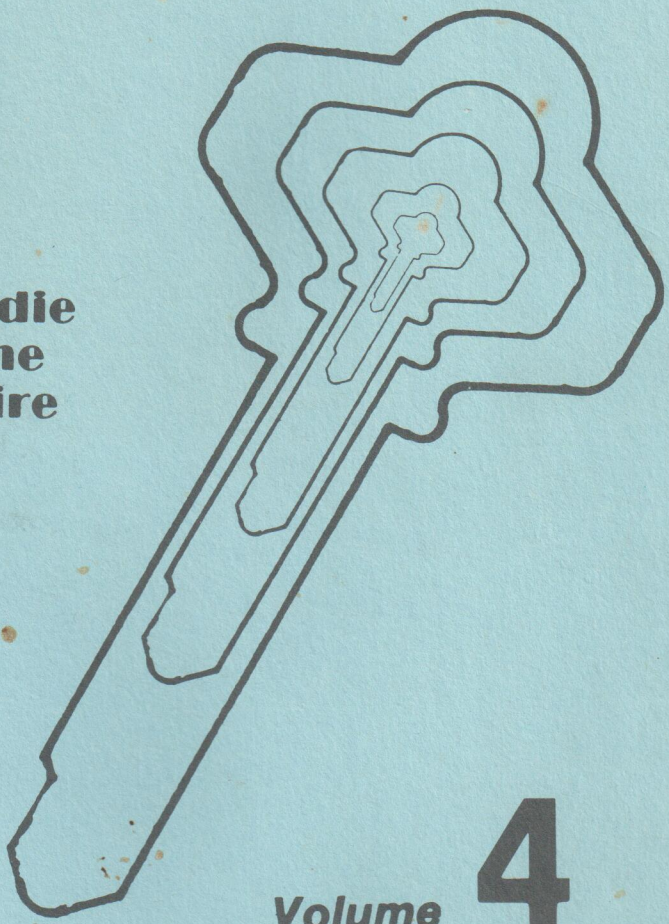
HOW TO MAKE YOUR OWN PROFESSIONAL LOCK TOOLS



eddie the wire

Volume 4

HOW TO MAKE YOUR OWN PROFESSIONAL LOCK TOOLS
Volume Four

Eddie the Wire

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Other books by Eddie the Wire:

How To Make Your Own Professional Lock Tools, Vol. 1
How To Make Your Own Professional Lock Tools, Vol. 2
How To Make Your Own Professional Lock Tools, Vol. 3
The Complete Guide to Lock Picking
How To Bury Your Goods

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CHAPTER 1
INTRODUCTION

Well, here it is over four years since I have spoken about the manufacture, design, and technique behind lock tools, picks and other devices. This new volume promises a lot of new material (no duplicates or rehashes) and new methods.

The bad news is that the security industry is big business and high-tech — more new hardware appears every day. The good news is that the lock tool business is also high-tech now — anybody who knows how can work wonders with custom tools.

Of course, the usual disclaimers apply: the author or Loompanics and its agents offer no warranty of any kind, either real or implied, regarding the accuracy, fitness, or content of this book and the information herein, and assume no responsibility for any and all damages, incidental or consequential, that arise from the use or misuse of this book and/or information.

There is some more bad news by the way: control of the smaller, uninhabited publishing houses such as Loompanics is not occurring now, but may well be a threat in the future, as it already is in Canada and some localized American areas. I get my education in places that most people never heard of, and if I go off the air we all suffer, so get it while you can.

CHAPTER 2
SOME LIKE IT HOT!

I have received numerous requests for detailed information on working with propane torches and also for tempering tools to squeeze out that extra ounce of working strength, and here it is. Manuals on gunsmithing are usually the best sources of detailed information on working with small, tempered metal parts, by the way, so check one out sometime for additional reading.

The problem with heating such small tools as lockpicks is that they warp badly. Also, as you know, it's easy enough to overheat a pick just grinding it to shape, let alone tempering it, so these skills have to be carefully done. A burnt pick performs poorly and can't be restored. Sell your first failures to the chumps for dollars and buy more steel stock.

Propane torches are available just about everywhere today. These are one-tank only models, the two-tank or one-tank with oxygen pellet chambers models are too hot for us. Some stores sell one-tank models with alternative gases (billed as hotter than propane) but again, more heat than we need.

Some kits have a flame spreader nozzle in addition to the standard one, but I never use mine. First read all the manufacturer's directions and safety precautions (even the stupid ones that tell you not to try and melt snow off your Delorean) and then listen to a few from Eddie!

Always hold the gas cylinder in a vertical position. This prevents liquefied gas from somehow getting into the feed tube, unlikely but possible. In fact, for the first try I suggest you nail a stake to the front of your workbench so it sticks up about eight inches and tape the gas cylinder to the stake securely. Aim the nozzle away from you but leave room to open the valve wheel. I find that some people are a bit uneasy about a

roaring torch (makes a good street weapon — how about a book on Ninja torch fighters?) so go easy the first time around.

Try opening and closing the valve — hear the hiss? Now open the valve about a quarter turn (most models) and hold a match or lighter flame at the EDGE of the nozzle, NOT in the air above the nozzle. This has nothing to do with singed knuckles, it just works better.

You should get a plop and a spear of flame, if not, try again perhaps with a little more gas flow, or even a little less. Eventually you will have a flame. Now one last trick, throttle it down v-e-r-y s-l-o-w-l-y to get a feel for the delay common in most propane valves, too quick and you lose it! When doing most tempering, light heat is more controllable, so save your gas by learning to throttle back. You must hear a slight pop as the flame finally dies. If not, the flame may still be slightly going, a definite health risk! Always check with the ears, then with the eyes.

Now to something useful. Remember how tough the 1/16" music wire stock is to bend? Not anymore! Grab a two foot piece using bare hands and hold the middle of the wire in the flame just where the blue cone points. It only takes about twenty seconds and you can bend it like putty. To cool it down swirl it around in a bucket or wastebasket of water. Examine the color of the wire after quenching and you will see a grey area where the surface was torched, and two zones of "spectrum" with different colors. As the heat travels down the wire it gets cooler, and each color corresponds to a different temperature. You may already know this from the dreaded "creeping blue" that ruins the temper on over-ground lockpicks.

This color can be used to great advantage later on. For now, let's make a tool for mass-producing tension wrench blanks from music wire stock.

First off, we need a block of 2 x 2 wood about eighteen inches or longer, a 2" butt hinge, a dowel rod 36" x ¼", and a ¼" spade drill or twist drill. Consider investing in an extra-length drill for this, it has a lot of value for drilling through thick wall construction to plant bugs. Drill a hole as deep as possible into the end of the wood, and attach it to the workbench with the hinge as shown in Figure One. The stop block is an optional but nice touch; put it in after you know exactly where the rod-holding block should stop. The wood screw adjusts this point with precision.

The dowel rod is to be cut to length(s) and put in the hole in the wood block to act as a depth stop for the wire. This will adjust the length of the cut-off stock. With this set-up I can process about 80 pieces an hour with no danger of kick-back or burned fingers. I use a circular magnet on my pinkie to pick out the hot wire lengths. This and other magnets are available at the local electronic parts store.

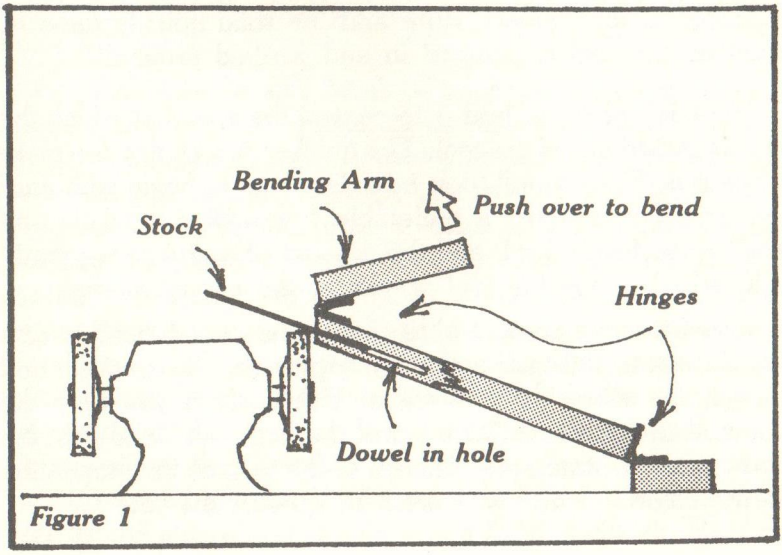

Figure 1

Next step is an identical jig (or the same one) with a torch pointed at the spot where you want to make the bend. Once adjusted you can pop a wire blank in and heat it to the desired softness, then pull it back and swing over the bending block. The screw regulates the angle of the bend, and remember that some spring-back will occur depending on the softness of the wire. Pliers pick the wire out to be quenched, and the next part is processed. If you are doing a small run leave the wire unquenched and grab it with vise grips for immediate tip grinding.

Once the tip is ground (don't worry about over-heating) put the tip back in the torch and heat it to a cherry red. I work in the dark to better see this color (and foil the feds). *Immediately* when this color is reached on the very end of the wrench withdraw it and plunge-quench it in the water. There are a couple of variations to this, you can grind the tip before bending if you want control over the tip-to-shank angle. Also you should try quenching in (yes) lard. Large tubs of lard are available at the grocery store and the solid quickly turns to liquid as the tool is plunged in and worked around.

The trick of using lard is to control the speed at which the heat is pulled out of the tool. The quicker it is cooled the more brittle it is. Since small tools have less heat to begin with, lard cooling which is slower is preferable. I cool all of my picks and small wrenches in lard, and the amount of warpage is greatly reduced. A too-brittle tool breaks at the wrong moment.

Sometimes the amount of temper at the wrench bend is such that the wrench distorts under heavy pressure. If so, reheat and quench the elbow only in water. Obviously if you hold the elbow in the flame for 30 minutes the heat will bleed past the elbow and "contaminate" the rest of the tool, so the minute the cherry color is where you want it, quench the tool.

As an experiment, heat an elbow to cherry and then pop it in an oven preheated to 400 degrees. Shut off the oven and let the metal cool stone cold. Notice that the metal is softer (the technical term is annealing) but this is only kitchen level tech. The rule is *cools quick — tough and brittle; cools slow — soft.* Usually the trick is to get somewhere in the middle except at the places where no bending is allowed, like where the shank meets the handle. These places must be absolutely as hard as possible.

There is one other little trick, if you are contemplating a soft break (an entry where no traces are left to prove that an entry took place): the working face of the lock pick where it contacts the pin can be annealed or softened by leaving it out of the quench and heating it in the torch. In order to do this, lower the pick handle first into the water until the water level is halfway up on the shank, then lift out of the water and reheat the working face to red, then pop it in the oven as before. For even better tempering, lower the oven temperature gradually over four hours. Metallurgists have expensive ways to do this but an oven will serve.

For the ultimate soft break a piece of brass stock can be substituted for the usual steel. Brass shim stock can be found at the same industrial supply houses that stock steel. Brass would be a real good choice anyway, you say? Not really, for three good reasons. Number one, it clogs up the grinding wheel. Number two, the strength is much less, so tempering is essential. Number three, brass wears too easily. Brass tempering is also very difficult, and tempered brass at best is no match for steel. If you experiment with this style of tool, be sure to get the thickest possible stock that will fit in the keyway you are working in. Regular keys are brass, brass alloys, or aluminum but they get their strength for years of turning from the corrugated shape, which your tool will not have. Always beef up the shank and shoulder of a brass lockpick. You can also try aluminum, but the same rules apply.

I have had better results with materials like phosphor bronze for soft break lock tools. This alloy is hard to find, but electrical supply houses sometimes stock it. Check the Yellow Pages under brass.

Here are a couple of problems seen in lockpick manufacture that heat will easily solve. Suppose you have a favorite lockpick with a too-thin shank that bends at the shoulder every time you use it because it was burned a little during the grind. The fix is simple, just fire up and heat to cherry red the exact point where the shank meets the shoulder, then water quench. Then pop it in the oven and slow anneal. Another problem is drilling through the body of a steel pick to attach a couple of handle rivets just like the "professional" models. There are two ways to do this. The easiest is to chuck a piece of drill rod the size of the rivet into a drill press, leaving about an inch protruding. The end of the drill rod must be flat. Now lower the rod to contact the pick body lying on the table of the drill press, at the point where you want to drill for the rivet. While holding down the pick with the rod, clamp the pick to the table with a "C" clamp. Now set the drill press for the highest R.P. M. and start up. By pressing down heavily on the pick body friction is generated and it starts to heat up. Eventually the rod end will form a spot of burned metal the usual blue/straw color. Stop then and reclamp for the other rivet, and watch out for burnt fingers. After the second spot has been formed let the pick cool slowly on the bench. Drilling at these points will now be a snap, especially if you pre-punch the spot for the drill.

The second way to soften the handle is simply to light up the torch and begin to cherry the pick body starting at the handle end. Close observation and slow heating will show you the color band that advances down the tool toward the shank. When the band gets to where the second rivet is to go, quench the pick in water working end down and allowing the water level to rise only to the beginning of the shoulder. This stops the

heat from bleeding into an area where you want the pick to remain tempered, yet does not quickly cool the handle area.

The easy right-angle bends that a torch makes possible can be extended to the tension wrench. In fact, the bend of choice is a half twist followed by a right angle. The half twist makes it easier to exert tension on the wrench because the fingers press against the flat side of the wrench. To do this, do *not* clamp the wrench stock in a vise while heating. This would cause the heat to quickly transfer to the vise jaws and the stock would never heat sufficiently. Use the quarter-inch stock found on the sewer snake as detailed in the chapter on mass production. After heating the twist area to cherry, quickly clamp a vise grip onto the stock and insert into the jaws of the vise that have been pre-set just far enough apart to allow stock insertion. Now give a quick ninety-degree twist and then some to allow for possible spring-back. Now put the stock back in the torch and when cherry again do the other bend. You will find that the twist will support the stock and it can be easily bent with hand pressure. After the second bend, quench immediately.

The double-finger wrench is also easy to do with heat. Use half-inch stock for this one. Cut a deep slot into the end of the stock with a very thin grinding wheel. As a matter of fact, if you don't want to buy a very thin wheel for your shop, it should be noted that although it is very hard work to cut this shim stock with a file, if you heat up the end cherry red and then pop it in the oven and slowly lower the heat, the steel will be dead soft annealed and easy to cut. I use a wheel, though. It is sometimes possible to use what is called an abrasive cut-off wheel to cut a thin slot in the shim stock. Once the slit is completed, heat the end of the prongs created by the slit and then bend them both over using the thin slit in the vise as before. Remember that most vises have a lot of slop in the screws so pull the vise jaws as far as possible before setting the slit. Quench immediately. The last step is to cut the tips of the

wrench to the bare minimum to allow maximum clearance for the tool in the lock. Since the wrench is double-tipped, each tip does not need to wedge in the keyway, and they can also both be a minimum cross-section.

I recommend that you get a torch and use it a lot. Get familiar with it and it will become another tool in your arsenal. Steel that has an indifferent hardness can be easy to work with but not hard enough to use once cut. Flame hardening and annealing can make the difference here, and it increases your choices of supply for steel. Even common house nails that were impossible to use are now acceptable in an emergency if you can harden them. I have successfully produced tools from large carton staples and box nails using only a lighter on high for a heat source. A single charcoal briquette also makes an effective heat source if you use a hair dryer or soda straw as a blower. The more you blow the coal, the hotter it gets and the quicker it consumes. Put four bricks around it for a little furnace and away you go. While we are on the subject of nails, I will let you in on something else: a concrete or cut nail is superbly tempered for pick material. Grind it cool and set it in a wooden handle or hold with vise grips — it is a little short, but great steel! There is one more trick I have for this chapter.

Ever lose a pick? Ever need to stash one for later use? The ultimate hidden pick is one that's magnetized and stuck to the underside of anything steel or iron! The amount of places like that are unlimited, and if the pick is enameled to match the surface color, and placed high up, it is almost undetectable. If only Houdini had such a tool. To magnetize a pick, get a reel of heavy wire, either auto ignition or bell wire. Even lamp cord works well. Lighter wire will melt. Now wrap even turns around the tool handle and tape these down lightly, then tape the whole assembly to one end of a yardstick. Leave at least a three foot lead on each end. Strip both ends to get two inch long bare wire ends, attach one end to the negative on your car battery. Cut

another three foot long piece of wire and strip both ends for two inches. Make a second end of the tool-stick-wire assembly into a loop, and insert one end of the extra wire lead through the loop. Now make a similar loop in the end you inserted, but make it *around* the wire going to the tool, as shown in Figure 2. Now separate the loops by at least a foot, and tape them so they can't slide together and make contact. Now tape the end of the yardstick to the car hood inside so it hangs free. It will get very hot! Finally make sure the exposed wire loops don't touch the car, and connect the remaining lead to the positive on the battery. The object is to feed current through the wire, which will create a strong magnetic field and cause all of the molecules of the steel to become also magnetized. They will stay magnetic when the current is shut off. Now take a coffee can with ice water and put it on a towel somewhere on the radiator, lowering the wire wrapped tool into the can by lowering the hood of the car. Let the tool not touch the sides of the can. Cooling the tool is essential because heat will weaken or destroy magnetism. Now have your assistant start the car, and pull the loops together, making contact. The wire will quickly heat up VERY HOT so don't touch. Give it about ten seconds and then separate the loops, then go have a drink while the wires cool, but leave the engine running. When you get done pull the tool out, leave it wrapped, and test for magnetism with a piece of steel. If it is not strong enough, repeat the process until it is. This method only works with car or storage batteries of high amperage. It will blow your fuses and possibly start a fire if you do it using house current, so don't. Also make sure to stay clear of the car and all moving parts while doing this. Ideally, the can of water is on the ground in front of the car, and the hood is closed.

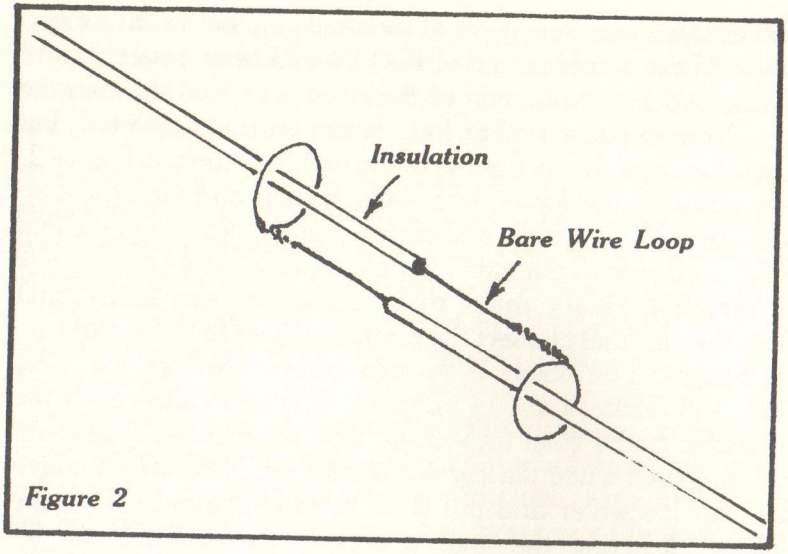

Figure 2

Once magnetized, a pick should be kept attached to a steel or iron plate to preserve the magnetism, or you can always top it off by repeating the process later on. It doesn't make any difference which way the coils run around the tool. Also if you leave the current on for too long, or the wire is too thin, it will melt through and may short out, so do this with caution and watch out for any hot metal parts. I keep at least four or five picks fully magnetized for that sudden emergency — you should too! It is easy to ditch a tool, even flip it about seven feet to land on some metal surface, and then deny you ever saw it before! Most people can't even catch a "plant" like that if it is skillfully done — try a little more practicing throwing magnetic tools and a little less flinging knives or stars. I know of one mechanic who was thoroughly searched, but had "checked" his tools at the door (frame) and retrieved them going out again. That is real class.

CHAPTER 3
THE TENSION RING

I have talked about tension wrenches that don't need to be held under tension in order to keep a lock partially picked. You know the problem: either the hand slips, gets tired, or the night watchman comes around to "check the glass," and you have four out of five pin tumblers in place on a really tough high-low-high combination. Previous wrench designs used weight on the end or a rubber band thumbtacked to the door. There is a better way.

Another problem that I talk about is the really narrow keyway that only an extremely cut down wrench will fit into. The professional shops carry so-called tweezer or straddle wrench designs, some work, some slip out at the lousiest times and you start over again! There is a better way.

Amount of tension is always a problem. The starting artist usually puts too much tension on the lock core and never gets anywhere. Then he puts too little on and never gets anywhere. There is a better way that solves all three problems.

Go to the local bearing specialist. Ball/needle/roller bearing assemblies are sometimes found with the industrial suppliers, sometimes as a specialty supplier, often in the junk box of an electric motor rebuilder, or the local auto graveyard. We are looking for a small, thin assembly about two inches in diameter.

The accompanying Figure 3 shows you the idea. The two "teeth" are set to anchor into the top and bottom of the keyway, and provide turning pressure. If you are good enough with tools and there is enough metal in the inner race, a perpendicular hole could be drilled and tapped for a retaining screw that would allow the teeth to be moved and repositioned or even changed for different lock styles.

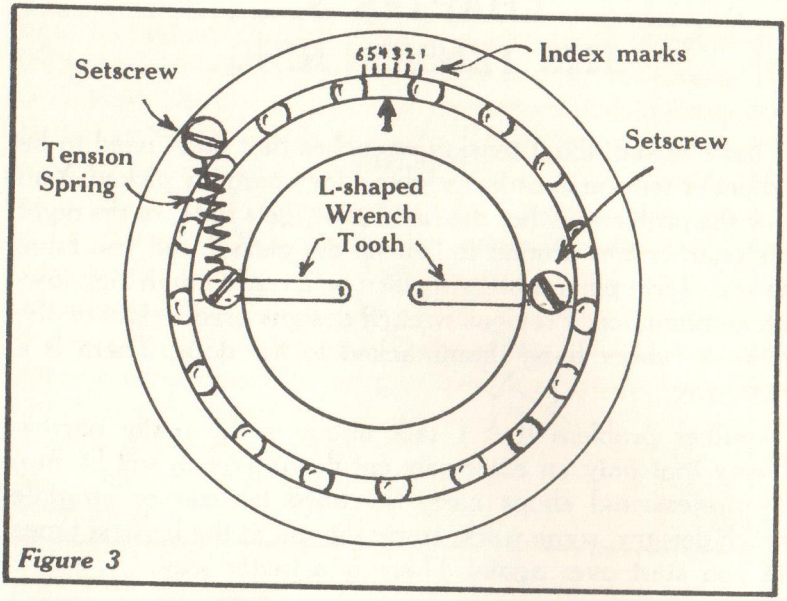

Figure 3

The outer race is engraved with one of the burglar etching tools to a scale of 1-7 and a mark engraved in the inner race to match the scale. The coil spring can be changed at will and made shorter/longer to provide a true scale reading and different pressures. The outer race is fixed to wooden doors with two light nails or spikes, and a couple of magnets epoxied to the outer race (clean of all grease first) will hold it to a steel-clad door for light pressure applications.

I carry several different styles of tooth and tooth tips to accommodate all the locks I haven't seen. Each set of tips must be bent to the same contour, so use a jig or place them side by side while try-bending. A torch will do a good job here because you can put the two pieces of wire side by side and heat and bend them as one unit. The different tips of the teeth, by contrast, are almost never the same. The average keyway is

much different in contour at the top than at the bottom, and each tip must be ground to fit as closely as possible yet allow the maximum clearance for the pick, which is the whole idea in the first place, remember? Finally, the shank of the tool should be left long enough to allow about two inches to protrude from the outer race. This will give you a handhold to position the teeth before tightening, and you will allow some leeway if the race is not on concentrically. Ideally, you should measure the lock cylinder (some mechanics call it the plug) *before* the break, or at least know what it will be based on (the type and model), and set the teeth so each one is the same length to the cylinder. This makes the tension device rotate with the same center as the lock. If one tooth is very long and one very short, even though they both touch the plug at the right place, the tooth fit will suffer as the plug turns. Isn't there a soap opera called as the plug turns? Anyway, it isn't too critical, but try to even up the teeth and the rotation will be smoother. I also keep detailed records of which pressure numbers seem to work well on what lock types and brands, and whether lubrication was applied recently, which makes quite a difference. Coil springs are available at all the better hardware stores, and hobby shops as well. If a spring is too long do not stretch it to make the engraved scale line up, instead, clip a couple of coils off with a cutter and bend down the end coil to be the new end loop. Stretching will make the spring respond differently over its pull area.

The two pins drilled in the inner and outer race to put the spring loops on may also be drilled and then tapped. The advantage to that is you may put a washer over the spring coil to prevent it from slipping off, then screw the whole assembly down. To make the scale show up better under low-light conditions, paint the engraving with black or dark nail polish and rub it well into the grooves, wiping off the excess. Then let dry and put a stripe of white or light colored nail polish over the

scale area, avoid the black scale markings, which will be hard, so use a small brush. When this is dry, coat the whole thing with clear polish and the job is done. I often paint my gun sight ramp in a similar fashion to make it show up better in the dark. The concept can be extended to any other of your blued tools that almost disappear after ten o'clock. A series of white stripes may tell you which tool is which, but touch coding was covered in an earlier book, so just stick to putting a large enough mark on the tool so it can be found again if you accidently drop it!

The best way to secure this to the door is with a couple of light, thin nails that you have sharpened and tapered on the grinding wheel. Most doors are wooden, and the nail will bite in enough to keep tension on the lock. If you are working a steel door, a magnet is necessary. You can "fence" the bearing with magnets all around it and over it, or epoxy a couple of magnets right to the outer race. Don't attempt to magnetize the whole assembly, and don't try to solder a magnet to the race, it won't work for at least four good reasons.

For some locks neither method will work. The decorator style door sets often have a large, irregular plate around the cylinder for decoration, and often this is cast and of poor magnetic quality. In order to get your tension device to fit here, creativity is called for. One answer would be to drill a hole into a piece of wood exactly the size of the outer race, and insert same into the wood. To make the tension device stick on temporarily, soak the wood in gluesize made with hot water and liquid mucilage or hide glue. The first is an office supply, the second is a Sears exclusive. With the hard place effectively bridged you can easily nail the wood to the door as before, or use magnets. Try to make the wood as light and as thin as possible. A piece of quality paneling would be thick enough, and the piece could be contoured to taper at the ends.

If you are contemplating a large number of breaks at places where those decorative lock plates prevail (they usually are on

the better homes) I recommend that you build a tension device with a large diameter, say four inches or more. The bearings are not too expensive — if they are, you are buying a high precision bearing you don't need and should try the junk pile, and the extra diameter will allow you to straddle most installations and mount right on the door. The larger the diameter, the less critical is the tooth spacing also. I just said that the better homes have the fancier locks and that reminds me to clue you in on a professional tactic.

Two things happen when a "luxury" home is built. First, the specification sheet for the hardware usually is more specific on the subject of locksets than the usual *locking set.* Many spec writers working for architects will specify a particular brand (often Schlage because of its quality) and not the type or model of lock. When this happens and the spec sheet is passed to the builder he will try to purchase the cheapest lock available that meets that spec. I know of one entire subdivision where the builder installed Schlage locks, but used the wafer tumbler system instead of pin tumblers. The spec was met, but the security level was delightfully poor. It would have been better to buy cheap Italian pin tumblers.

The second thing that occurs is related to the first. When a subdivision is built, you can take bets that all the locksets will be of the same make and model. Builders employ semi-skilled job workers to install such locking hardware, and seldom keep track of the key codes. This means that each installation is identical, and a method that works for one will work for all. It also means that the key codes will be randomly picked by the supplier, and not picked for higher security low-high-low pin combinations. The only exception here is the home of the do-it-yourself nut who adds or changes the locking system, but this is rare. The busy professional does not have time to work on his locks, and this means that the busy professional mechanic can more efficiently do his job. The younger in age the subdivision,

the less likely that any locking systems have been replaced or altered. I always keep a lookout for new construction, completed about six months ago. I would much rather work on a slightly worn lock than a corroded sticky one. If you can't eyeball a representative lock, go to the builders supplier and get a lock "to match the one on our front door."

This also holds true for types of window and garage locks. Remember to avoid the strongest link in the security chain. Furthermore, always check the subdivision for a large number of intercoms and/or music systems in the houses. It is an interesting fact that hard-wired security systems and intercoms usually go hand in hand, often produced by the same supplier and sharing some of the same system components. Builders that offer intercoms usually will also offer hardwire alarms since they are easy to install during construction. Again, such systems will be installed by a subcontractor or a team of guys who work subdivision-wide, and each installation will follow a set pattern (unless the owner is paranoid and insists on special measures). Sensors will be all one type, and control panels will be in one of two locations. Wiring will usually *always* be the same since subs are not sophisticated enough to uniquely wire each panel. If you can chart one location, this information is a valuable starting point for penetrating other systems. This also extends to the terminal boxes and keying systems used for the alarm system. If one has rotary locks, they all will. If one has disc locks, they all will. You are relying on the builder being unwilling to stock many different types of hardware. Finding the builder's supplier is a lot easier for alarm systems. Usually only two or three wholesalers stock intercom/security systems so it is easy to narrow down the field. Only very rarely will a builder purchase parts from a supplier who only does security systems. If this is the case, the subs were probably alarm specialists, and you should proceed with much more caution! This usually spells sophisticated technique like double-ring

mains and infra-red sensors. You have been warned! Please don't disappoint Eddie by shattering the nerves of the entire subdivision some dark night. Your personal security is always the first concern.

That ends this chapter on new tension devices and how to survey a subdivision. Coming up are more methods for tool mass-production and a discussion of perfectly soft breaks using pre-cut tools.

CHAPTER 4
LOCKPICKS, INC.

Why should the mechanic spend his time mass-producing tools? Well there are a couple of good reasons. First off, the well-equipped mechanic should have at least three duplicate sets of tools — one for the car, one for the pocket, and one to stash somewhere.

There is an even better reason, however, and that is to sell tools! Most people react with envy when they know you have a set of lock tools, but are astonished to learn that you actually made them yourself. REMEMBER, POSSESSION OF THESE TOOLS IS A FELONY IN SOME LOCAL JURISDICTIONS. This means that if you are stupid enough to flash a set in a bar, and follow that up with a brag, you deserve what you get. On the other hand, if you deal one-on-one with somebody, a small set of tools with case might be worth as much as thirty dollars. The locksmith supply houses charge even more, and for poorer quality too! A formula that never fails is to show off on a disc tumbler lock, and then get your potential customer to try the same. Most people can successfully pick such a lock with a little help from you on the tension wrench. Once your mark has done his first B&E he is only too eager to buy a set of tools. Nobody ever admits to making such a deal either, so you have a loyal following.

Part of the magic behind such a sale is the low profile don't-tell-anyone-where-you-get-these-tools approach. This is a guaranteed draw to one in three people. I can't begin to count the number of sets I have floating around. To be in the business you have to work cheap and quick, however, so a set of fixtures and jigs will make it possible for you to turn out a lot in a little time. Here's how.

Material selection is critical. Regular ½" shim stock is the best for a serious tool, but the amateurs can get by with the

steel found in the do-it-yourself sewer snakes sold at K-Mart and elsewhere. This steel is only a ¼" or so wide, and comes in a reel ready to go on the machine we will make. It is also pre-blued.

Figure 4 shows the jig used for cutting the steel to length. Since the set we are making is standardized, one length fits all tools. Blanks should be cut 6" in length. Initially, also, the sewer snake end should be nipped off the steel tape with a grinding wheel. Pull the steel through until the end butts against the stop, then hold the clamp arm down and push against the grinding wheel. When the cut is a little more than halfway through the thickness of the steel, a sharp bend will often break it off clean and save burning the steel. Experience will tell when and how to snap. Then put the piece in a tub that has a spacer in it to keep the cut-offs aligned, and repeat the cycle. Wear gloves and eye safety glasses during all production because of the numerous metal slivers generated by all this grinding.

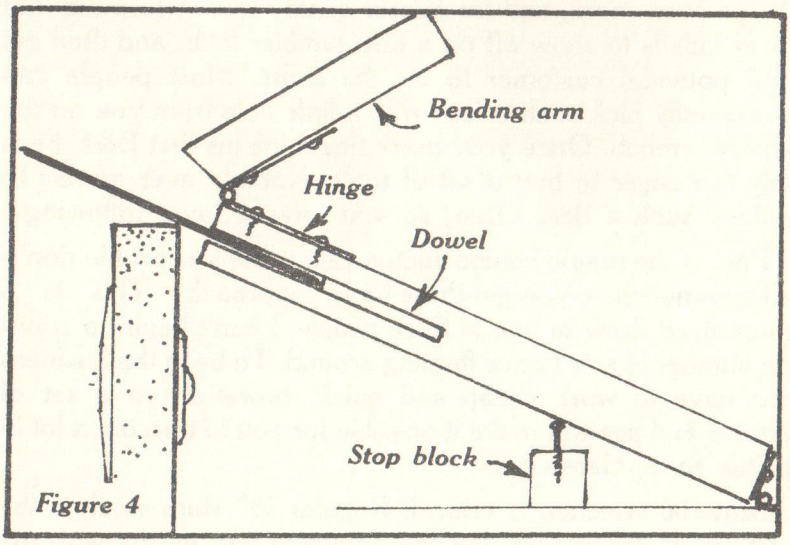

Figure 4

All of the pieces will have two ground ends, so it doesn't matter which end you grind the relief cut and tool contour on. I have experimented with jigs to guide the tool and produce a precise contour each time, but a scribed outline on the tool seems to work as well, and you can always pack-grind the tools as described in *How To Make Your Own Professional Lock Tools, Volume Two.* This is where the pre-bluing of the sewer snake stock pays off also. There is one jig that will help.

To cut thirty relief cuts in three minutes will reduce the bulk of your wheel time, and it can be done automatically! In Figure 5 the jig for the job is shown. Notice that several grinding wheels have been installed side by side on a common shaft. This is to produce the necessary width to grind a relief cut in just one pass. If you don't have a machine with such a long shaft, however, I suggest that you use a radial arm saw and move the jig over for overlapping cuts. This is especially efficient if you have installed automatic carriage feed. The carriage feed is merely a milk jug or metal one gallon can with water inside for weight. To use the jig insert a number of cut-off blanks edge up into the cradle and clamp them down with the sliding plywood edge, which is then tightened. Then tap them all down flush with a block of wood. If you are making a deep cut each time, the pressure may make the blanks climb out of the cradle. If so, reduce the depth of cut (and the heat generated) or put an additional block of wood over the top of the handle area for a down-clamp.

Heat may be a problem, depending on the depth of cut and speed of the carriage. The heaviest weight the can/jug will allow without making the grinding wheel "hog down" should be used. If you are working in an area where a little water will not hurt, a stream of water can be played on the metal from an overhead jug. The flexible tube travels along with the carriage. The more metal in the pack, the more the heat is dissipated also.

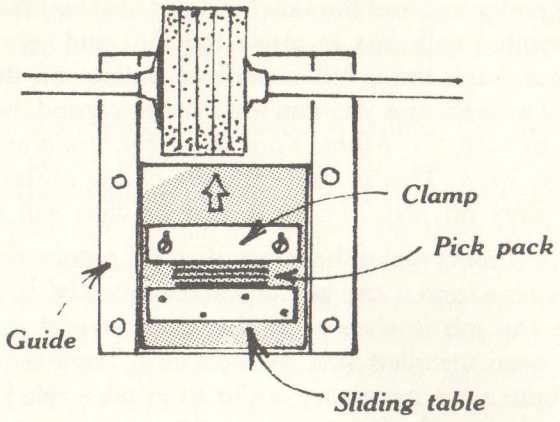

Figure 5

After making the first cut, move the machine (or the grinding wheel) over and make another cut. Three cuts should be sufficient for the average width wheel. Again, watch for metal splinters. Now unload the pack from the cradle and do the individual tip grinding. I prefer to do this using a master clamped in the vicinity of the grinding wheel to use as a template against which the tool being ground is checked from time to time. If you anticipate very high volume, use two or three grinding machines (each machine has two spindles) with contoured wheels for roughing outlines, and one thin wheel for final work.

There is one other thing a gang-cutting jig like this can do for you. If there is a given diamond height or a given individually-lifting rake height you want to make a lot of, just set the wheel to match this height, and make a cutting pass with the wheel right at the tip area. With a radial arm saw mounted grinding

wheel, the saw head and wheel may be tilted and the two angles that make up a diamond pick can be ground in one pass each. The bottom of a pick can also be pack-ground with this jig. A little thought expended on just how many cuts can be executed on the sliding jig will make up for hours of grinding individual profiles at the wheel.

Okay, the tools are all rough ground, how to polish them easily? The answer is to tumble them. Rock hounds are familiar with tumblers: rubber lined barrels put on their sides on motorized rollers. The barrels are filled with parts and a variety of polishing media and the action of the media on the parts as the barrel turns brings them to a polish. This is something you turn on and then leave to go play a round of golf. In fact, most polishing takes 2-3 days but it is automatic, so what do you care? I use a special mixture called stones and oil to polish my picks. The oil is 20 weight motor oil and the stones can be anything from tiny pieces of coarse sandpaper torn up and poured in to sand to pea gravel to carborundum grit in various sizes (available from heavy industrial suppliers). Only experimentation will reveal which material works well for your situation, since the fineness of the grinding wheel determines the depth of the scratches that must be polished out.

If you don't want to invest in a commercial barrel, an empty one gallon paint can works just as well (by the way, always fill only half full) and a rotating cradle can be easily devised. Figure 6 shows a cradle capable of processing four cans simultaneously, each barrel having a different grit size. This is real high production. To sieve out the tools once polished for transfer to the next barrel, use a colander and a plastic pail. Insert the colander in the top of the pail (it should just catch on the pail rim) and pour the barrel out into the colander, then shake the grit and oil through the colander into the pail, then dump the tools into a tray to rinse with soapy water, then into the next barrel. The same treatment also works with ragged

edges on formica handle blanks, which is the recommended handle material for a production-for-sale pick set.

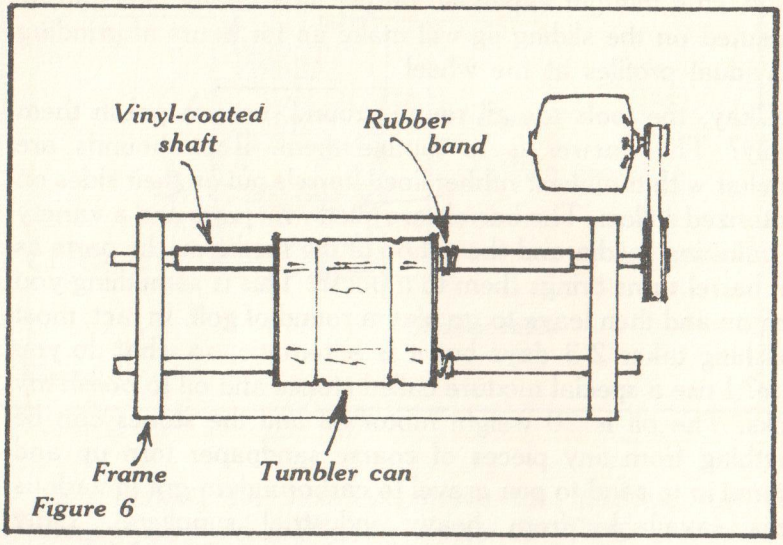

Figure 6

For lockpick cases, I recommend a bank bag case with a formica insert with the tools inserted in elastic cord loops, as shown in Figure 7. These are easy to make since the formica overleaf can be drilled in stacks of five or more, and easily laced. The bank bags are available for a dollar or so each, and it is even possible to get a vinyl hot-sticker logo put on for a small screen set-up fee. Contact the t-shirt imprint people for information about this. The lettering on the bank bag, if any, will come off with a rag and some methylene chloride (try chemical supply depots), but handle this solvent with care, it is toxic and so forth.

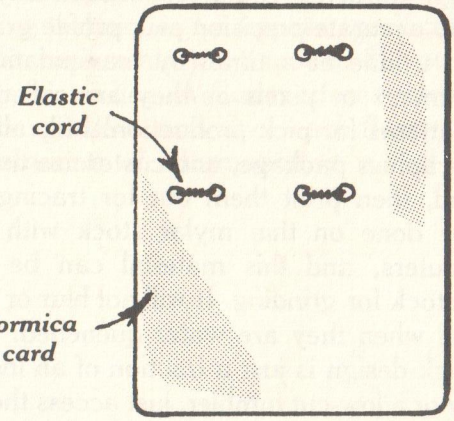

Figure 7

For those of you making lock-pick pens (a fountain pen with the insides removed and a lockpick inserted) the epoxy resins are just the thing to set the pick into the pen top handle, and this was covered in *How To Make Your Own Professional Lock Tools, Volume One*, but use epoxy mixed with thixotropic paste to save a little and make alignment easier. These also seem to sell well, and eliminate a lot of the hassle of making a handle.

Instruction sheets are also a nice professional touch, and the absolute high-tech answer here is a computer generated text with accompanying graphics. I now use a computer graphics system to do all my writing and illustrations, which is a long way from the typewriter and technical pen of yesterday. Contact a local users group for computers and you will find

someone willing to do the job on a shoestring. The Commodore or Macintosh systems are both capable of good graphics; the Mac is superior though. In fact, if you invest in such a system, you can generate very accurate precision pick profile graphics that can be changed a little at a time (by manipulating the individual picture elements or pixels as they are called) and then used to make patterns for pick production! I file all good pick designs with a graphics package, and customize them on screen at warp speed, then print them out for tracing. The printing can even be done on thin mylar stock with some graphics-mode computers, and this material can be glued directly to steel pick stock for grinding. It will not blur or decay as paper patterns will when they are water quenched. If you find that your new pick design is just a fraction of an inch too big to clear a keyway or a low-cut tumbler, just access the pixel mode of the graphics package your templates are stored in (most graphics packages allow this, ask the store expert or user group) and crop a pixel or two off, then reprint the image on mylar. This system is too good for the serious lock student to ignore. With a good graphics package I can design and print fifty variations on one tool design in two hours, and size each one correctly. It is even possible to draw an exact scale keyway on the screen, or an exact-size cutaway view of the entire lock with all the spacings and tumblers accurately positioned, and then design a pick on the same screen making sure that all dimensions are automatically accurate. The true professional will translate all of his code-book charts to computer graphics files on floppy diskettes, and punch up each file for each "break" and design the proper pick or print out a previously designed and proven contour. A file number assigned to the screen is then etched on the actual pick once cut out, and all the information about that particular lock is available just by calling up the file with the matching number. That's the kind of high-tech tool that will be needed to effectively stay in business

as the security industry grows in sophistication. Eddie is considering offering such graphics and informational files on floppy diskettes for many major locking and security systems including techniques for bypass specifically keyed (pardon the pun) to each make and model. If you are interested, drop Loompanics a line. A Commodore system to implement this is very inexpensive, and since each floppy is capable of holding large amounts of information, it is well worth a second look.

CHAPTER 5
HANDLE WITH CARE

I have covered all kinds and styles of lockpick handles in the previous 3 volumes on making lock tools, but there is one more class of handle material that should be looked at. This handle can be rough or smooth, any color, any shape or size, is almost break-proof, waterproof, flexible, and easily applied by the mechanic. I now put an epoxy resin/fiberglass handle on all my small and medium tools, and this is how to do it.

Fiberglass is just that, a cloth woven out of tiny threads of drawn glass, similar to fiberglass insulation material. It comes in many different thicknesses (weights) from paper thin up to woven glass cloth or matting. The thicker the covering, the more epoxy it will absorb.

Epoxy resins also come in many different consistencies from thin as water to the usual syrupy stuff that hardware stores sell. By the way there is another family of resins called polyester resins. These behave in much the same way as epoxy but are not as strong, and are less expensive. For supply, I go to the local auto-body store and claim to have a dent in my Mercedes-Benz.

The kit I buy may also be found at some K-Mart type stores in the automotive section. Usually these are labeled fiberglass body repair and the like. Do not get epoxy body putty, this is a different product based on the same chemical reaction. The stuff you want should have a small supply of glass cloth, a small tube of hardener, and a can of clear resin.

If you want to do exterior moulding (not necessary but it looks nicer) then pick up some plaster of paris, some mold release spray (auto body store or industrial supply) and some oil based modeling clay (not air hardening like play-dough, although this works in a pinch). Let's start with a simple cloth wrap and some resin.

After reading all the directions to get an idea of the process, pour off a small portion of the clear epoxy resin and add the correct amount of hardener. Try to work by weighing the amount you are mixing in order to get the proportions right. Try for one-tenth of the total weight of the resin can, for example. After thoroughly mixing the resin and hardener with a popsicle stick or plastic knife, smear some of the glop on the handle of one of your deceased lockpicks. Now with a pair of scissors cut a piece of glass cloth as wide as the handle is long. Make the cloth long enough to wrap around the lockpick handle about four times. Now put one edge of the cloth even with the edge of the lockpick and make one full turn around the handle, pushing the cloth into contact with the glop at all points. Try not to make the wrap too tight or all of the resin will squeeze out. The resin should soak into the cloth. Now apply some more resin from the pot to the cloth wrapped on the handle, and make another turn, sort of like making a circular peanut butter sandwich. Continue on, making sure the resin wets all portions of the cloth thoroughly, and no bubbles or wrinkles are wrapped inside the handle. Finish off with a light coat of resin and try to butter it down smooth. My trick here is to use an ice cube to smooth the handle sides. It won't stick easily to the resin and slows down the reaction. If you plan to heat cure the part to speed the reaction, then it may be wrapped in aluminum foil for a real smooth and stick-free handling experience, although it may be difficult to get the foil back off if you use the real thin stuff. Try some mold release sprayed on the foil before application.

In fact, let's talk about the reaction. If you took about three hours to wrap the handle, you are in big trouble now because the resin has already set up. Depending on the room temperature, age of the resin, amount of hardener, and relative humidity, the resin will harden at different rates. If you have a big project going on, try cooling the work area and the resin. If

you need a rush job the completed part can be baked anywhere from 100 degrees to 300 degrees depending on various factors. Start at low heat for the first few rush jobs. I sometimes use an old clothes iron as a curing stove with varying thicknesses of plywood separating the tools from the iron shoe. A little experimentation will get the heat right without over-curing and making the part brittle.

When fully cured (anywhere from three hours to two days) check the hardness of the fiberglass. Are there places where it is still soft, even sticky? Not enough hardener or thorough mixing. Are there cracked areas? Too much heat or hardener. One test run will generally be enough to get the proportions right. This cured coating can be worked a little more if you wish. It can be sanded (*absolutely necessary to wear a dust mask for any fiberglass working*), drilled, filed, sawn, and so on.

If you want a super-smooth surface, sand it starting with medium and going to fine then superfine and then even to 600 grit if you wish. Use the black silicon carbide wet-or-dry silicon paper and let them soak for ten minutes, then sand the handle, rinsing the paper out frequently in the soapy water. The water keeps dust down and lubricates for better cutting. When you change grit size, wipe off the handle and discard the old water, wiping out the jug as well. This is to keep grit particles from scratching the surface. For the finishing touch use auto rubbing or polishing compound, but hold off on all sanding until you are sure the resin is fully cured.

Nice handle, huh? This will resist just about any rough treatment. I leave my handles just a little rough because I find them easier to grip when damp (either from rain or sweaty palms). For a little better handle than a flat-wrap, try using a spacer in your next wrap. Any material will work, finishing nails, match sticks, balsa wood sticks, brass tubing (a piece of

tubing inserted into a wrap is an invaluable asset for two reasons: you can store other small parts there and put a cork in the tube end, or insert a piece of close-fitting music wire and have an instant extendable handle that retains the feel so necessary to this line of work), plastic straws (can be filled with resin), copper wire, the list is endless. To bulk up a handle quick and keep it smooth and straight try some formica/plastic laminate strips. Put a thin coat of catalyzed resin on the handle like glue, then two strips of formica cut to fit the handle (or overlap) then more resin and a wrap or two. For a convenient hanging eye, grind the barb off from a fishing hook and embed it in the wrap with the eye protruding from the handle end; with a piece of monofilament fishing line holding the lockpick, you can do all sorts of magical tricks. For instance, magicians use an appliance called a "pull," just a piece of elastic cord or surgical rubber tubing (local large drug stores will stock this or know where to send you) attached with a cord to a socket-shaped piece of plastic. The elastic is pinned to the inside of the jacket sleeve at the armpit or further up into the jacket and runs down the sleeve to the hand. The magician stuffs the silk into the socket, lets go of it, and it is pulled up into the sleeve like a flash. Open the hand, it's gone! The mechanic could use a similar trick to quickly hide a tool, and many mechanics suspend tools from a thread down a sleeve, down the back, or a trouser leg. With about ten feet of surgical tubing I can tie one end to a post twenty feet away, step on the stretched end while working a lock (to give the tool slack) and if I need to ditch in a hurry I just pull the tool out and hold it away from my body, step off the tubing and zzzzzzzzzip, the pick is nowhere in sight! By the way, an extremely rough-handled fiberglass wrap is difficult to lift prints from, although this technology has improved dramatically. It is now possible to lift prints from the *inside* of a latex glove as one bank heist participant discovered, so either take your gloves with you and not throw them on the

floor at the scene, or use canvas gloves. To continue with the handles, you can also roll up a piece of glass cloth and soak them in resin then insert them in the wrap as spacers. A skillful mechanic can match just about any hard contour he wants to with a set of cloth spacers like these. To make it easier to do this, try to wrap and soak the spacers well before you wrap the handle — this way the spacers will be starting to cure and will better retain their shape under the wrap tension. Torch or lighter heat sometimes accelerates the cure of these spacers, but this is tricky.

Now if you have done a regular wrap handle and a spacer wrap, let's try a mold. If you sanded the wrapped handle you may have noticed that tiny fibers stick up through the resin if sanded too much, and that the weave of the cloth is visible through the resin. To avoid this unsightly and irritating fiber shedding, most commercial articles are built up with a coat of clear resin on BOTH sides of the glass cloth. This is called a gel coat.

Take a lockpick, put some oil-based clay on the handle, and mold it to the hand contour you want. After doing this, spray it with mold release compound (silicon spray will work in a pinch). Now mix up a batch of plaster of paris and pour some into a Tupperware sandwich box or equivalent, leaving at least an inch of free space in the box for pouring the top half of the mold. As the plaster just begins to cure so that it will hold the weight of the pick with the clay handle, insert the handle *halfway* into the plaster. This is roughly the same treatment as the silicone rubber handle described in Volume One. You should carve two shallow depressions in the cured plaster to act as keys for the top mold half. Allow to dry and then spray the whole top surface of the plaster, with pick still embedded, with mold release. Now mix up another batch of plaster and pour this over the lower half of the mold, up to the top lip of the plastic box. Allow to dry and then flex the plastic box, getting

air to all parts of the plaster block and trying to get it out of the box. If necessary, you can cut the plastic. Then remove the two halves of the mold and clean out the pick and all clay handle material. Spray both faces of the mold liberally with mold release. Epoxy resin will stick to just about anything unless you use mold release.

Select a pick and apply a thin coat of catalyzed resin to the handle, then let cure. Now apply another coat and wrap with one wrap of glass cloth, then coat the cloth and apply another full turn, then let cure. Finally, mix another batch of resin with catalyst and apply a thin coat to both faces of the mold *only where the handle is supposed to be.* Allow this thin coat to cure until it is barely sticky and then pour additional catalyzed resin into both parts of the handle area. Now insert the pick into one half and quickly clamp the two halves of the mold together. It requires a little skill to accurately estimate how much resin is needed to fill the handle cavity without overfilling. If you have trouble with this it is better to be a little short than too full. Voids can always be patched up later with a little bit of resin.

Allow the whole unit to cure now (note: you cannot bake a plaster mold, it must cure at room temperature only) and carefully separate the mold halves. If they stick, go slowly with a minimum of prying. If the mold release was not thick enough, it may be necessary to break the mold. You can always make a new one and try again, this tool will be okay. How does it look? If there is additional resin clinging to the tool (flash) just cut it off and sand the parting line. As before, small voids or pits can be left or filled with more catalyzed resin. If the tool tilted in the handle, allow more drying time for the gel coat before filling with resin next time.

A good tool handle design mold should be kept. In fact, if you make a plaster positive of such a mold, a flexible rubber negative mold can then be made from liquid latex by

repeatedly dipping the plaster positive into the latex and allowing each coat to dry. The advantage of this is that you can make multiple copies of the rubber mold, and process five handles or so at a time. Such mass-production is more economical when working with catalyzed resin because you can just pour the resin into the mold until it is full, then flex the mold away from the handle when cured. I use a rack that suspends five lockpicks in the middle of five molds by grabbing the tips of the tools. It is just a board with five holes drilled in it. The molds are secured directly below each hole, and the tip of the lock pick is passed through the hole and held with a clothes pin. I pour an exact amount of resin into each mold and then lower the tools into their molds at the same time until the resin rises to the top.

If you go into mass production like this, a few tips will make it easier for you. Epoxy resin can be "doped" with a filler consisting of glass fibers cut or chopped short. Some manufacturers call this a thixotropic paste. That means it makes the resin thicker, and is a cheap way to extend a batch. You can mix a little or a lot in, depending on the strength you desire. If you are doing a flat wrap style try using a thicker cloth or even a glass mat. Some matting is woven for bulk, some for strength. Most of these types of fiberglass supplies are carried at boating supply stores for hull repair or layup. The boating supply store may also carry the polyester resins as well. These are not as strong, but are worth a try because of the reduced cost. For cleanup and diluting the catalyzed resin, use only acetone, available at paint suppliers. Some resins can be thinned so much that they will soak into wood, and then harden. Such a handle can be very beautiful if an exotic wood is used, and some boating stores carry supplies for doing this to teak wood decks. Ask about it.

As I say, I prefer an epoxy/fiberglass handle for all of my lockpicks now, and all of mine are color-coded. Adding color

to the resin is easy. The auto body and marine suppliers both carry special liquid dyes that can be mixed with the clear resin to produce a permanent color in any intensity. A little goes a long way, so buy sparingly. Some workers prefer to leave the color out of the final gel coat, some others color only the final coat — it's up to you. If you leave the resin clear, any suitable material you use for filler can be marked with information and resined (or glassed as they say) over. Some magic marker materials will bleed, some won't. White formica handle scales in particular, can be marked, or etched with the engraver and then marked before glassing to produce an impervious crib note, like the direction of a certain lock's rotation to unlock, the wiring of an alarm system whether normally closed or normally open (it's funny what you forget under pressure, ever been in a school play?), or the number and cutting of the tumblers you are working on. It should also be noted that the vibrating engraver does a nice job of marking as well, and that engraving is discernable to the touch if you can't see.

There is one other handle to consider, the thin wood dowel. The trick is to accurately drill down the exact center of a thin dowel. To do this, you need a special drilling jig for your drill press. By the way, drill press adapters that use regular hand drills are available, and that is usually all you need for locksmithing. Secure two drills, one the size of the handle material, either diameter or width if flat stock. The other drill should be the same diameter as the handle dowel. Most well stocked hardware stores carry doweling in three foot lengths and a variety of diameters. You also need two pieces of quarter-inch plywood about 2 x 2 inches. Chuck the smaller drill in and clamp one piece of the wood to the drill press table. Drill a hole through the wood. Now, without removing the clamp or moving the wood blank, chuck up the larger drill and drill a hole *halfway* through the wood blank. Now remove the wood and insert a new blank. Drill a hole again halfway

through the second blank with the same, larger diameter drill. Now run the table as low as it will go and cut a piece of dowel to such a length that it will just clear the top of the second wood blank when the *dowel* is chucked into the drill. Make sure that this dowel is absolutely straight — check by rotating the chuck by hand and looking for the tip of the dowel "walking." If it is warped, use the torch to heat it slightly and warp the dowel. Wood will bend while warm and retain its shape when cold. Overbend to allow for some springback. When the dowel is straight, chuck it in the drill and move the wood blank until the end of the dowel drops in the hole you drilled. Clamp the wood there and don't change any of the press adjustments. Now chuck the smaller drill and cut a handle blank long enough to just clear the drill end when the lower end of the dowel is inserted in the wood block clamped to the table, and the first wood block is put over the top of the dowel so that only the smaller hole is up and the dowel top end is inserted in the hole you drilled halfway through the *first* wood block. If you now start the drill and insert the drill bit through the small hole that shows at the top of the block, this hole will be automatically through the exact middle of the dowel, and furthermore, the axis of drilling will be the same as the axis of the hole in the wood block on the table. An almost perfect hole ensues. You can drill up to the depth allowed by either the drill bit or the drill press spindle feed. If you get to the end of travel, you can stop the drill in the dowel, rechuck the drill bit as low as it will go and still be gripped by the chuck, and gain an extra ¼" or so. For most applications, a hole this deep will suffice for an adequate handle bearing surface.

If there is room, you can reverse the dowel and drill the other end, making two handles to be cut apart, or one with a hole all the way through. Two tools may be mounted in this case, or even in a handle not cut apart, the choice is yours. To permanently set the handle on the tool shank, use some epoxy

diluted with acetone, or super glue. If you use super glue, let a coat dry on the inside of the dowel before inserting a second dose and then the handle. The first coat will be absorbed by the wood. To finish the wood, there is a neat trick I learned in the far-off Orient. You can use enamel, shellac, lacquer, varnish, and so on. Whatever you use (I prefer lacquer) pour it into a closable jar that is as deep as the handle is long. Now grab a junked out clock motor and epoxy an extension shaft to the second hand shaft. Hobby store brass tubing comes in a size that will fit over this shaft (the one in the middle) so put a half inch piece of that over the clock shaft, and buy a piece of music wire that will fit inside the brass tubing. Super glue both parts together. Extend the music wire out to a support of some kind. The easiest way is to mount the clock on a 2 x 4 and nail or glue a small piece of 2 x 4 on edge at the other end of the wood the clock is on. Just drill a hole for the music wire to penetrate into the wood about one inch, and oil the wood hole with machine oil. Now glue the end of a piece of thread on the music wire shaft itself, and attach the other end to the tool end of whatever tool/handle combination you are finishing. Adjust the length of the thread so that the tool is suspended handle down into the jar of lacquer or whatever, with the handle completely covered. Allow the handle to soak for a minute, and then turn the clock. If you got the thread wound around right the first time, the shaft will revolve and begin to pull the tool handle out of the lacquer, but very slowly. Since the extraction is so slow, the excess finishing material runs off into the jar without causing any drips or runs, and the result is a perfect finish, and very thick, too. If you used a music wire shaft of too large diameter, the tool will be pulled out too quickly, and runs will result. If in doubt you can use the minute hand shaft for a real slow pull.

This rig may be too much trouble for one or two tools, so do these by hand, or cut a coat hanger in the form of a crank, tape

some thread on it and rest it in a couple of vee grooves cut in a box that you fit over the jar of finishing material, leaving enough room for the handle to be completely withdrawn. If you make a full rig with the clock, the thread can be attached to a coat hanger hook, and three or four handles dipped simultaneously. If you go to this length for mass production, it is easier to tape the thread to the music wire shaft so it is easily unwound for the next batch. Another idea is to glue the thread to a piece of brass tubing inserted on the music wire shaft, and then tape the tubing to the shaft. To unwind the thread, remove the tape and pull the thread out, then retape.

For added color when using the clear finishing agents, try a little wood stain on the handle first, but allow it to dry thoroughly. Identification or other information can also be applied, before finishing, with a felt tip marker (some bleed and some don't, so experiment). A wood handle is a good mass production alternative, and is the most lightweight of all possible bulky handles. It can also be drilled for keeper cords. The diameter is up to the mechanic. I prefer 3/16" or a little less. The front part of the dowel handle can also be taped with rough sandpaper by chucking the completed handle in the drill and applying the sandpaper to the spinning dowel. Follow up with fine paper. If the paper is cut in long strips it can be applied to the dowel shoeshine fashion, but watch out for heat induced friction, and also remember that the paper can be sucked up by the rapidly spinning dowel and pull your fingers in as well, just like grinding the wrong way on a grinding wheel, so use caution.

For a bit of touch-only identification on a wooden handle burn a shallow groove in the butt. To do this, chuck the front of the tool in so the butt shows. Get a piece of soft copper or stove pipe wire and put two pencils, one on each end of the wire, wrapping the wire around the pencil twice, then around itself to secure the end. You should have about ten inches of free wire,

kind of like a Godfather-type garotte. With the dowel rotating at the highest possible speed, hold the wire tightly using the pencil handles, and contact the middle of the stretched wire with the dowel at the point where you want the ring. By applying pressure against the dowel, the wire will heat up and burn a groove in the wood. Be careful to not apply so much pressure that the wood snaps. Be patient and you will see the wire cherry up suddenly. Burn one, two, or three grooves for identification, or, if you like the look, groove the entire handle for a non-slip grip. Finish off with a coat of clear finishing agent.

CHAPTER 6
THE OLD SOFT SHOE

A "soft" break is one that is undetectable. If a break is detected, and things like business plans or code keys have been copied, not stolen, the whole operation is blown because the plans will be changed, and the keys also.

The primary method of detecting a break is either by finding physical evidence, or by the security system. I have talked about most types of physical evidence unwittingly left at the scene, but there is one important item more — scratches on the tumblers or lock casing. The fine quality steel that professional lock-picking tools are made of is necessary, of course, to prevent bending the shank in small cross-sections, but most if not all tumblers are made of brass or nickel-silver, and this material scratches easily when you rake or otherwise slip the hardened steel tool over the tumblers. This also applies to sloppy insertion of the tool onto the keyway; telltale marks are always left on the face or keyway that can be detected and even age-determined using a low power microscope. A corporation that has removable core locks keyed alike and disassembles and checks daily has a good chance of detecting a skilled entry. Of course a truly security-conscious place may have a cardkey or similar entry system, but usually not on the initial access, and it is here that time limits are important in gaining entry. Once inside, time is not a big concern. Remember also that a cardkey, when properly bypassed, will show absolutely no physical trace of one or a hundred unauthorized entries! Therefore, only worry about the highly-polished brass locks and faces.

There are two approaches to the problem of leaving no physical traces. You can impression a key, but many such high-security locks are based on so-called restricted keyways. Blanks and cores for such locks are available only with some

documentation access like an authorized on-file signature appearing on the work order. Some systems go so far as to throw away the codes, and further contact between the user and the security supplier is made impossible!

Therefore, the best way to soft break such a system is by a soft pick. Modern science has not yet come up with a plastic material tough enough to serve for a single-diamond rake pick, but a serrated pick fabricated from delrin, brass, phosphor bronze, or plexiglass is very possible. All of these materials have reduced ability to scratch the tumblers of a lock. My favorite is delrin.

Plastic specialty suppliers are the best source for delrin and plexiglass. Avoid plastics of unknown formulation and don't waste time looking for these plastics in your usual supply stores. The closest alternative from the hobby shop is PVC sheet. When you locate a plastic supplier, secure stock of a thickness greater than the largest keyway you will work on. This is because you will sand or cut the stock to a precise fit in the keyway for maximum strength.

One advantage to a plastic pick is that you can cut a groove down the length of it at the bottom using a router, drill press, and a guide fence. Why do this? The answer is simple. A plastic pick just does not have the strength to stand up without bending or breaking if the shank can only be as wide as the keyway is from the tumbler bottom end to the first paracentric ward (see Figure 8). The steel picks you cut actually angle into the keyway and extend down to the second paracentric ward. Your plastic card picks must be cut away where the first ward is, and the router will neatly accomplish this. Only cut away as much as necessary to let the plastic pass. If you want a precision fit, obtain a keyblank for the same type and model of lock, and use a divider or micrometer caliper to get the keyblank measurements, then duplicate these on the plastic.

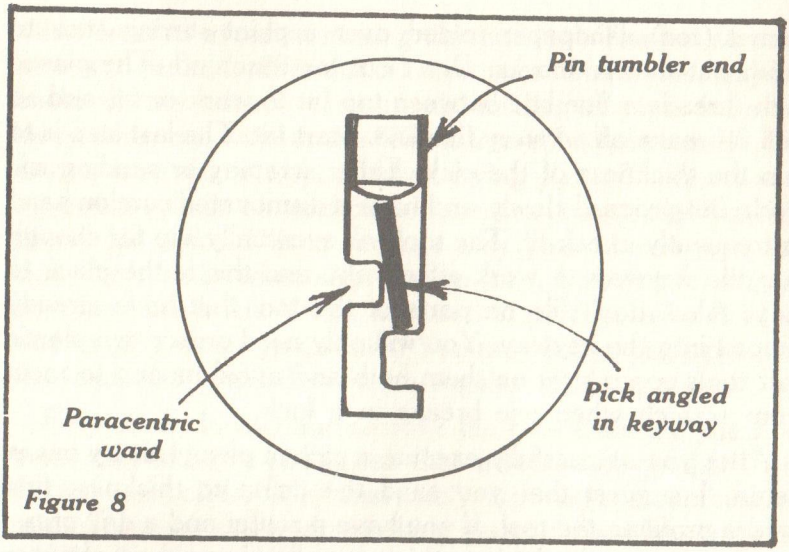

Figure 8

Try the plexiglass first. The clear type comes with paper on and instructions not to remove from the paper until all machining is done. Disregard these directions and remove the paper. Scribing lines show up with more clarity on the polished surface. The grinding wheel is out for shaping once you have traced the outline you want on the plastic. Use your favorite pick profile as a blank, but move the pick parallel to the shank once traced, and trace a second or even a third diamond profile on up the shank. To make the deep cuts for the shank, try a fine-toothed saber saw. Be very careful that you don't overheat the blade, because it will melt through the plastic where you don't want. Quench the blade frequently. To do the roughing cuts around the diamond, use the same fine saw, but use a double-cut file for final shaping, and clean the teeth frequently with a file card.

Try to make the shank a little thicker than the usual, but not so thick that it will hit tumbler ends. Use medium then fine

garnet (red) sandpaper folded over a paint stirring stick to finish out the file marks. Don't cut too much off. The plastic pick threads a fine line between too fat to work or fit, and so thin it breaks off. A very fine line. Start fat. The last step is to thin the thickness of the pick. Either scraping or sanding will work, but proceed slowly and have a dismounted core on hand to frequently check fit. The tool will eventually slip far enough into the keyway to work effectively, and this is the place to stop. Also, don't file on parts of the tool that have already slipped into the keyway. You will only need one or two plastic soft tools so go slow on them both and avoid having to recut from scratch when one breaks in a lock.

After you successfully execute a pick in plexiglass try one in delrin. I suggest that you sand the delrin to thickness first before profiling the tool. If you have a router and a drill press, use them to cut the delrin to thickness, slipping a sheet of paper under the plastic to lift it and allow the router to cut deeper, or use the drill feed if it is accurate enough. Once thickness-cut, finish in the usual way. Delrin is much stronger than plexiglass, and is a self-lubricating type plastic, so I prefer it when using a plastic pick. I wanted you to try an easy plastic first though, and some people like plexi better, so try both.

Brass and phosphor bronze are cut just like steel, but they will load up the grinding wheel more, so dress the wheel more frequently. The trick with these is the tempering. Phosphor bronze usually comes spring tempered and if not burnt during grinding will be just fine cold. Brass is usually supplied annealed, and must be hardened. Try a light straw color and then quench immediately in water. Do not oven-bake a brass pick. If the temper is not successful, heat to a slightly redder color and re-quench.

Note that all of these picks are double or triple-diamond riffle picks, and the brass/phophor bronze picks must be polished to

a fine level to avoid scratching the tumblers. The last strategy here is to make a riffler out of music wire. One of the "expert" books on the subject recommends building all picks from this lousy wire, but without the "Eddie secret" it won't work. The answer is to secure a set of wire curving pliers. These are used by jewelers, linemen, and piano tuners, and are called "smiling pliers" for short. This is because they have curved jaws that look like a smile when seen end-on (or a frown depending on how they are held). These are used to produce a bend in the wire exactly where you want it. You may buy or beg a pair, but you can also grind them from regular slip-joint pliers.

First of all, loosen and remove the rivet from the pliers, so make sure to buy a cheap pair that are screwed together. Save the nut and bolt for later reassembly. Now using a combination square or a parallel wood marking gauge draw a line down the middle of one jaw of the pliers. Using this line as a guide, cut the jaw on either side of the line on a bevel. The deeper the bevel the better, about 50 degrees is right. Now turn your attention to the other half of the plier. Clamp it in a vise, jaw facing upward, and leave enough clearance so that the matching half can be held on to check for proper clearance and profile. Use a triangular file to make the initial groove in the jaw, and widen the cut if necessary so that the angles are the same on both jaws. The vee groove must be a close fit. When you think you are done, reassemble the pliers and try to bend a piece of wire about 0.20 in diameter. If the wire fills the groove before the bend is completed or "jams," then take a little more off either jaw or both. Remember to leave enough metal on both jaws to retain bending strength. Eventually your pliers will make a perfect bend. Measure the angle the wire assumes after the full bend. If it is less than 40 degrees, you may have to insert the wire sideways into the jaws after the initial crimping to complete the bend. The wire angle must match the key angle fairly closely. The value of the bending plier is that it can make

the same angle bend anywhere on the wire's length, and as you know, this point varies depending on the depth of the tumbler cutting.

Now to the good parts. If you are trying to manipulate a set of tumblers and you realize that the first in line is very low but the other four are close to correct it is easy to straighten the wire by reverse-bending the wire and then re-bending to a better contour. In fact, a couple of trips to the lock with a week or so between is easy to do, and the resulting pick (once the contour is correct) will work quick and easy. Also, multiple picks may be constructed from tracings of a partial pick with one or two positions left blank to be bent in the field. The real hot set-up is to have a chart and codebook combination made up and ready. If you can get the code number for the key (usually stamped on) then you can actually cut (or rather bend) a pick for that tumbler combination. Just insert a pick and wiggle around a little while exerting soft tension with the wrench, and you're in.

The word "insert" reminds me about marking the lock face during a break. The lock face can easily be marked, especially if you use a brass/bronze pick and "rip" the lock repeatedly. The answer is simple, however — apply a strip of tape over the lockface, with a hole punched out for pick access. Cloth reinforced vinyl is best. Do not use other types of tape because they may tear and leave residue in the core.

CHAPTER 7
CORDLESS DRILLS

A professional mechanic has many uses, either strictly or slightly extra-legal, for a drill in the field. I have one and here's some information on what's best. Of the current crop, two stand out: the Skil and the Milwaukee. The Skil is also sold under the Sears Craftsman label (for more money), and is the cheaper and the slower of the two but also the stronger. The nice thing about a Skil, it comes with a charging stand in some packaging. The Milwaukee will set you back about double, but has a removable power pack, so you can charge one while using one, or carry two extras in the field for long hauls.

Both have the standard ¼" female hex, for which a variety of bits are available and extenders as well. Some stores also carry a drill chuck with ¼" shank, and these are really valuable. If you can't find one, you will have to cut a hex onto the actual drill bit. Alternatively, you can insert the drill butt into the hex and wedge it in with a small piece of hex key. It is good to cut a flat spot on the drill butt in this case, and orient the flat to meet the hex key wedge.

If you have built my cam-operated pick gun (see *How To Make Your Own Professional Locks Tools, Volume 3*) then the cordless drill will easily motorize it. Remove the crank and clamp the shaft end in the chuck, or cut a hex on the shaft end.

Another valuable use for this drill is as a screwdriver. It has twice as much power as you can reasonably generate, and never tires out. Be sure to have a selection of torx, robertson, square, and clutch bits for such use. More and more security hardware today uses these new fasteners, and since they transmit more torque they are always tighter than the average machine screw. In many cases the designer considers an unusual headed-fastener to be just as good as a lock, and the

person with the matching tool can walk right in. To take a good example, the cable decoder boxes are secured with a torx-style fastener, but modified with a blocking stud in the middle of the star. These are called anti-tamper or seat belt fasteners in the industry, and tools for them are difficult to obtain unless you know where to look. My source of supply is one of the mobile tool vans that travels a route of service stations, car dealerships, muffler repair places, repair shops, and automotive supply stores. There are three brands: Snap-On, Matco, and Mac tools. Snap-On is a Fortune 500 company, and the prices are high, but the selection is the best. Mac is next, and Matco is the bottom in price. Go to your local dealership and inquire when the vans come in. Then meet the guy at that time in the parking lot and claim to be whatever. Buy some other type of tool, and repeat this a couple of times until he knows you, then ask for a catalogue. Finally, go for the kill and load up on tools for special-headed fasteners. You can always sell extras at exorbitant rates. Another good bet is to pose as a school custodian looking for anti-vandalism fasteners. Buy twenty to try them out, and get the tool as part of the transaction. People never suspect you if you display a need for the fasteners.

In fact, the most knowledgeable people in the security industry are the installers and suppliers of security hardware, but cultivating them can be as difficult as making the break. Some companies will not deal with you unless you are affiliated with a trade organization like the A.L.O.A. or can show evidence of bonding. You will know when you hit the big leagues, because the going will get tough. How to crack this market? Here are a few suggestions.

As I recommended earlier in this book, get a computer! I can generate letterheads for *any* company, in any shape, size, or form. My system is a Commodore 64 with the Indus gt disc drive connected to an Okimate 10 printer and a monochrome

monitor. For software, I use a variety of packages: Doodle, Flexidraw 5.0, Koala Painter, Printshop, and Billboard. Over twenty custom-designed cuts dealing with the security business can be stored on a single disc and printed out on thermal transfer paper. There is one real secret here: whenever working, always try for the largest printing image possible, even if it means printing up a logo at full screen size and a letterhead also at full screen size. Take both finished print-outs to a copy shop and they will reduce the large images to letter-sized. The beauty of this is that the computer generated graphic (especially a Commodore 64) stands out a mile and looks kitchen-cooked because of the poor resolution. The jagged, blocky edges of the diagonal lines are painfully obvious. Anyone with some computer experience will know it isn't typeset, and all serious businesses have typeset stationary. When you photo-reduce on the copier, however, the "jaggies" disappear, and the smaller images can be pasted up to make professional-appearing stationery.

Once you have a hundred copies of a fictitious company, and one of the files to make more, you can start a mailing program to the suppliers. For a list of addresses, try *Security World* magazine or comparable publications. Architectural market periodicals and building trades publications are also often of value. Once the address list is completed, the computer system will also serve you in making a batch of mail-merged form letters. Consult your local users group again, or a software dealer, and get a copy of a mailing list program that will generate the kind of personalized letter you as "the occupant" frequently get. If you don't want to spend 4-5000 dollars, then rent a hacker for a while. Your offer of free software for the investment of computer time may well be worth it to the owner. Computer systems and rental software are also available on weekly trials or rentals from office supply

places. Try to avoid having this done by a professional firm, for obvious reasons.

Your mailing campaign will soon yield results, either promotional literature, denial form letters, or form letters asking for further professional proofs. These are highly valuable because you will get a picture of the type of information firms usually ask for. Future mailings can be tailored to these new specifications.

With a little patience, a good mechanic can build up a relationship of sorts with enough companies to get access to catalogues and parts stocks. Once this starts it will have a snowball effect, and soon all but the most suspicious companies will be willing to at least talk to you. The key thought here is that they want to make money from you, and thus are willing to deal with you. At some point though, you may have to spend some fairly serious money on a kit package or set of manuals. Buy wisely and save your money for the purchases that will really advance your career. Do buy specialty tools that you cannot easily make, but avoid commercial lockpicks or lightweight documentation.

There are two other tricks that I find will work occasionally. If you see a tool (a vibra-pick for example) you want to learn about or purchase, make a note of the serial number and maker. Armed with this information you can then contact the manufacturer and request schematics or owners manuals and parts as well. Be prepared with the serial number in case they ask. Of course, if you didn't have a number you could act exasperated and claim you were on the road, or the tool was in the service truck — be imaginative!

If you want to examine a particular locking system or disassemble it to make measurements, but you can't get recognized by the company as a legitimate locksmith, go to a legitimate locksmith and specify that you want such a system

installed in your house, or on your front door. During the installation, act the concerned homeowner and ask about duplicate keys and key control procedures the company uses. All the information you need will be supplied as part of the service the locksmith offers!

CHAPTER 8
THE END

So ends another edition of HOW TO MAKE YOUR OWN PROFESSIONAL LOCK TOOLS. I am alive and well (and on the outside too) constantly developing new ways to bypass the best of the hardware. Ten years ago, I would have bet that the new security hardware would eventually make the keyway obsolete, but time is showing that locks are increasingly relied on instead of the non-artifact or P.I.N./artifact access systems (like automated tellers). Just look at the back of any such device and you will see a bugged door and a five-pin tumbler deadbolt.

Although home security systems become more complex, the lowly keyed lock is still relied on for at least one link in the chain, and it is there that the smart mechanic enters. There will always be a way around any system.

What's next? Well, as I said earlier in this book, a computer database of coding and engineering data on specific locks. Also, methods for bypassing the do-it-yourself type of security and alarm systems. If you like these ideas, drop me a line in care of Loompanics. I am also working on a special lock trainer that allows a mechanic to practice lifting tumblers one at a time, and get an instant readout on a dial as to how he (or she) is doing, one dial for each pin. This system may also be built to read out as a series of light-emitting diodes or L.E.D.'s and set to signal if a tumbler other than the currently worked tumbler is accidently lifted. Home shop plans and wiring diagrams for this newest and best trainer will be available in the near future.

Best Regards,

Eddie the Wire